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# An ornithological visit to the Rubeho Mountains, Tanzania

J. Fjeldså, K. Howell and M. Andersen

This study is part of the Eastern Arc Biodiversity Programme of the Danish Centre for Tropical Biodiversity. It aims to describe and analyse biogeographic patterns in East African forest mosaics, particularly those of the Eastern Arc Mountains. These mountains, composed of old crystalline rocks and under the direct climatic influence of the Indian Ocean (Lovett 1988, Lovett & Wasser 1993), stand out as the biologically most unique part of the Tanganyika/Malawi Mountain Group (Moreau 1966).

Data are presented here from the first ornithological survey of the Rubeho (Usagara) Mountains which, together with the lower Uvidunda Mountains, form a large fault block west of Mikumi National Park between the Great Ruaha and Gombo rivers (Fig. 1). The only other ornithological records we know of from this area are two turaco specimens (see below) collected in 1923 by Arthur Loveridge, and labelled "Madizini", which is a small village in the foothill zone.

The Rubehos are isolated from the species-rich Udzungwa Mountains only by the narrow semi-arid Ruaha Gorge, and the Uvidunda/Rubeho block would appear to form a link between the Udzungwas and the more isolated Ukaguru, Nguru and Nguu mountains to the northeast. The Nguru Mountains are relatively well studied (see, for example, Stuart *et al.* 1993). The Ukaguru avifauna was described by Friedmann & Stager (1964) and Evans & Andersen (1993), and results from a survey of the Nguus were given by Seddon *et al.* (1995).

Most parts of the Rubeho highlands are covered in montane grassland. This area is generally uninhabited and only rarely visited by villagers. In the southeast, just north of the Great Ruaha Gorge near Mwega, there are some humid forest patches on the steep slopes of the Uvidundas, and in the northern part of the highlands, more than 100 km<sup>2</sup> of evergreen forest are found in the Ukwiva Catchment Forest Reserve, between 1800 and 2050 m. Isolated and much smaller forest patches are found on Mt Pala Ulanga (1625 m) near Mikumi National Park, and on Mt Lugunga (2357 m) northwest of Ukwiva. Because of a slight rainshadow effect from the Uluguru Mountains, the climate in this area is not very humid. However, we would expect an annual rainfall greater than 1000 mm in the mist zone on the eastern scarp of the highlands.

The lack of biological data from the Rubeho Mountains can be attributed to difficult access. From the east, the old road from Kilosa and Ulaya is broken up, and neither this road nor a newer road from Mikumi to Kisanga, reach the highlands. The only access by road is from the west (Malolo). A botanical team using the western route reached the highlands and found woodland and secondary montane forest over old cultivation at between 1600 and 1700 m (Lovett & Minja 1990). Hardly anybody from the nearest villages seems to have visited the montane forest along the eastern scarp. In this area the forest can be reached only on foot by ascending steep slopes from 600 to 1800 m



through *miombo* woodland and tall grassland. Because of the remoteness of the eastern highlands, we expected to find undisturbed humid forest along the escarpment.

As will appear in the following account, the Rubeho mountain forests were ornithologically disappointing because habitat disturbance by elephant and buffalo has strongly influenced forest structure. The degraded forests are thus open to invasion by ubiquitous species and the bird community appears to lack several of the 'good' Eastern Arc forest birds. On the other hand, the forests are an interesting example of the role of natural habitat disturbance in shaping the biota of East African montane habitats.

### Itinerary and Habitats

We visited the Kisanga–Madizini area, 9–25 September 1993, arriving at Kisanga via the road from Mikumi. Madizini (7°12S 36°30E, 600–700 m) is a well-watered area at the base of the mountains with marshy plains partly converted to rice fields and sugarcane plantations. Low hills are covered in semi-arid scrub (strongly degraded by burning). The area 2–5 km SW of Madizini (where the road system is interrupted) has a mosaic of woodland and semi-deciduous lowland forest dominated by riverine species. In September, the forest floor was dry but low-lying areas had a tall undergrowth of *Aframomum* sp. This area was the main focus of our study. However, between 18 and 23 September, the first author (together with T. Msangi from the Tanzania Forestry Research Institute and a local guide, Mzee Kapita), visited the highlands in the southern part of the Ukwiva Catchment Forest Reserve near the Yovi River (6°55–7°20S, 36°10–20E, 1700–2050 m).

The foothills and highlands had numerous buffalo trails. According to rangers in Mikumi National Park, a large proportion of the buffalo population found there moves west to Kisanga and up into the Rubeho Mountains during the dry season. Until 20 years ago this was also an important migration area for elephants and there is still a resident population in Ukwiva forest. These large mammals have had a conspicuous effect on the highland vegetation.

### Lowland forest

Altogether, c. 4 km<sup>2</sup> of lowland forest is probably the only vestige of this habitat left in the area. Although most large timber-trees (*Khaya anthotheca*, *Milicia excelsa*) have been extracted, an almost closed canopy was found along the streams. Other trees found were *Azelia quanzensis*, *Albizia* sp., *Aningeria adolfii-friedericii*, *Bersema abyssinica*, *Draceana usambarensis*, *Kigelia africana* and *Vitex* sp., and along the streams there were some large *Ficus* spp. The forest floor was dry, but along the clear forest streams there were level areas with a tall undergrowth of *Aframomum* sp., grasses, sedges and herbs. There was also an area of partially-flooded forest. On the ridges, a more open woodland-like vegetation was found, with *Albizia* sp., *Brachystegia* sp. and *Bridelia* sp.

## Hills

The lower hills (up to 1200 m) had some *miombo* woodland which was replaced by tall grass and scattered *Protea* and *Uapaca* bushes. Above c. 1500 m, the vegetation was lush and green, dominated by bracken and densely tangled thickets of herbs and brambles. In wet depressions there were rushes and small patches of lichen-clad *Bridelia* sp., *Myrica* sp., and *Tabernaemontana* sp. The steep eastern approach exhibited signs of annual burning, but the incidence of fire appears to be sporadic on the rolling highlands.

## Montane forest

Lovett & Pócs (1993) mention only dry montane forest dominated by widespread species in the western areas of Ukwiva Forest. The southeastern part of the forest had similar vegetation, with *Albizia* sp., *Myrica* sp., *Tabernaemontana* sp., *Vitex* sp. and *Ficus* sp. At higher elevations the forest was dominated by *Parinari excelsa* and *Croton* sp. The many gaps in the forest were filled with tall herbs and vines. Habitat of this type was found as far as we could see from the ridgetops in the southern part of the forest. The human impact on the forest was negligible (one *panga*-cut seen in four days) but signs of trampling and bushes tossed around by elephants were everywhere. By maintaining a mosaic habitat with numerous light-gaps, the elephants favour weedy species of shrubs and trees which, therefore, gradually replace species that would otherwise be expected to dominate in montane forest. Because the highlands are rarely visited by humans, we believe the main reason for the presence of large areas of lush grassland and thickets, and the poor stature and quality of the montane forest, is a result of long-term disturbance by large mammals.

## Methods

We made general observations, some mist-netting (2180 net-metre-hours (= nmh) in forest and 1344 nmh in marshy habitat at Madizini, 1800 nmh in Ukwiva forest) and Timed Species Counts (TSC) by JF in forest habitat. The method used is described by Fjeldså & Rabøl (1996). Records were taken for ten minutes (morning and late afternoon) in 25 separate 1-ha plots in each study area, recording only birds which were inside a pre-defined 1-ha area—a method almost identical to that developed for Afromontane forest birds by Koen (1988). The efficiency of mist-netting and TSC was negatively influenced by dry and sunny weather (low activity in the understorey and low song activity).

## Results

Altogether 153 bird species, most of them widespread birds of bushland habitats, were recorded in the Kilosa–Madizini–Ukwiva area. Community structures, based on TSC from forest habitat, are illustrated in Fig. 2.

Among endemic species of the Tanganyika/Malawi Montane Group, we found only White-chested Alethe *Alethe fuelleborni*, Spot-throat *Modulatrix stictigula*, Sharpe's

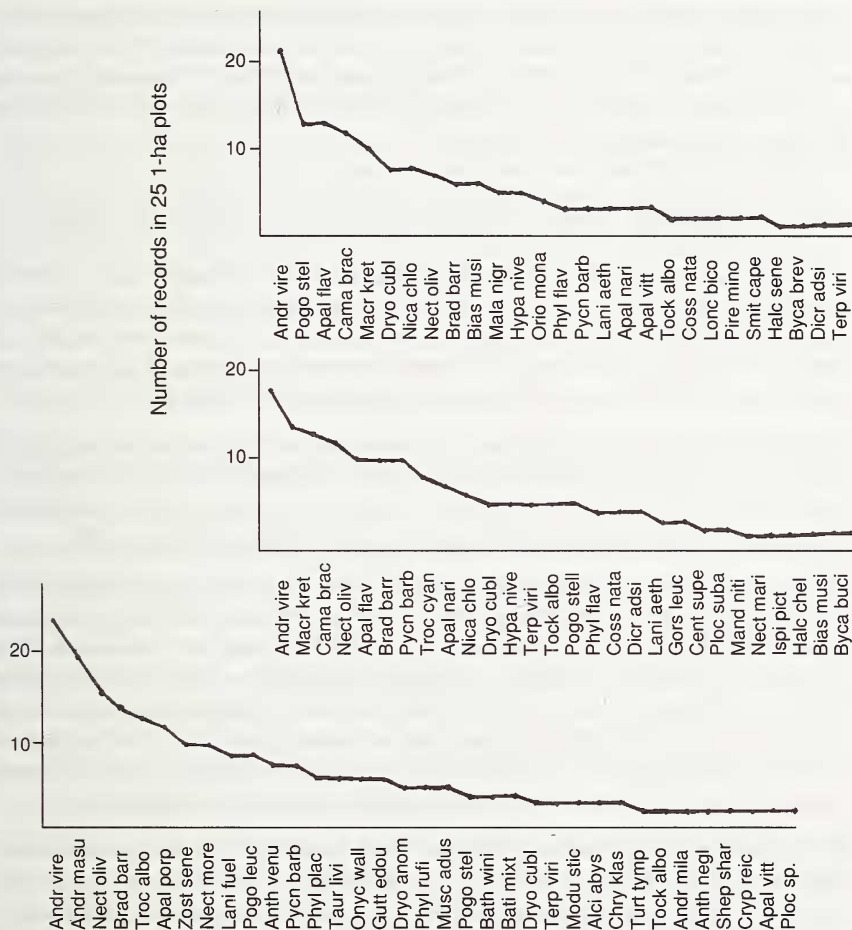


Figure 2. Rank-ordered species abundance curves for birds, based on samples of 25 1-ha plots studied ten minutes (see Fjeldså & Rabøl 1995). The plots were inside the main patch of lowland forest near Madizini (A), along edges between forest and swampy areas near Madizini (B) and in Ukwiva forest (C)

Akalat *Sheppardia sharpei*, Chestnut-throated *Apalis porphyrolaema* (*chapini*), Mrs Moreau's Warbler *Bathmocercus winifredae*, African Tailorbird *Orthotomus metopias* and Uluguru Violet-backed Sunbird *Anthreptes neglectus*. Also, there were rather few typical forest understorey birds: Olive-flanked Ground-robin *Dryocichloides anomalus*, Sharpe's Akalat, Spot-throat, African Hill Babbler *Alcippe abyssinica* and Red-faced Crimsonwing *Cryptospiza reichenovi* in montane forest only; White-starred Forest-robin *Pogonocichla stellata*, White-chested Alethe and



Evergreen-forest Warbler *Bradypterus barratti* in highlands as well as lowlands; Pale-breasted Illadopsis *Trichastoma rufipennis*, Red-capped Robin Chat *Cossypha natalensis*, Orange Ground Thrush *Turdus gurneyi*, Peters' Twinspot *Hypargos niveoguttatus*, Green-backed Twinspot *Mandingoa nitidula* and Lesser Seed-cracker *Pyrenestes minor* only in lowland forest.

Comments on the most interesting observations are given below.

**White-backed Night Heron *Gorsachius leuconotus*** One pair was observed on several occasions, and at close range, in groundwater forest on the border of an open, inundated area near the Madizini camp. Although widespread in sub-Saharan Africa, this species appears to be uncommon or at least rarely seen, and in Tanzania it is known only in the north and west. The record near Madizini, and observations in 1994 and 1995 (by P. Honess and M. Rahner) at the Ruipa river in the extensive lowland forests south of the Udzungwa scarp, are range extensions within Tanzania.

**Crested Guineafowl *Guttera edouardi*** Few were seen in the lowland forest, but the species was common in areas trampled by buffalo and elephants in the Uquiwa forest, 1800–2000 m. In Tanzania, this species is usually restricted to lowland and foothill forests, but it is well known from highlands in western Kenya (Britton 1980).

**Livingstone's Turaco *Tauraco livingstonii*** Common in the Uquiwa Forest. A bird seen very well at c. 10 m distance had white cheek-spots as found in nominate *livingstonii* but dark terminal spots to the white tips of the long crest feathers, as found in the form *chalcophus* (Kenya to Hanang). In two specimens from Madizini in the Academy of Natural Sciences, Philadelphia, one had tiny dark terminal spots to the crest feathers, and both had a rather narrow white cheek-spot. This indicates a secondary introgression by the northern form, and raises doubts about the view of Dowsett-Lemaire & Dowsett (1988) that isolating mechanisms have evolved.

**Bar-tailed Trogon *Apaloderma vittatum*** Seen on several occasions in a dense and shady area in the Madizini Forest, 15–18 September (at 600 m, in a area where Narina's Trogon *A. narina* also occurred). Once two birds were seen together, and on one occasion a female-coloured bird was seen very well, permitting careful checking of the short bill, pinkish facial warts and the tail barring. This is the lowest altitude record of this typical montane forest bird.

**Pallid Honeyguide *Indicator meliphilus*** One was seen on 21 September in fairly open forest at 2000 m. There appear to be no previous records of this species between the Zambesian woodland zone west of the Malawi Rift and northern and coastal Tanzania (Fry *et al.* 1988).

**Bennett's Woodpecker *Campethera bennettii*** The endemic Tanzanian form *scriptoricauda* (for rank see Dowsett & Dowsett-Lemaire 1993) was seen daily in half-dead trees in the ecotone between tall grassland and woodland. It was occasionally seen in groups of up to six birds, often together with a pair of Golden-tailed Woodpeckers *C. abingoni*.

**Kretschmer's Longbill** *Macrospenus kretschmeri* One of the commonest birds in the lowland forest canopy and edges draped with dense vine-tangles. Three specimens were collected. A few individuals were heard singing in *Tabernaemontana* groves up to 1800 m at the Yowi headwaters. This species is common in coastal forest and thickets up to 300 m and the Rubeho records thus represent a westward and altitudinal range extension. Kretschmer's Longbill was found to be uncommon in Kimboza Forest in the lowlands east of the Uluguru Mountains (JF *pers. obs.*) and in 1995 it was also found in forest habitat around the perimeter of the Kilombero Valley.

**Mrs Moreau's Warbler** *Bathmocercus winifredae* Fairly common in forest glades with densely tangled herbaceous vegetation in the Ukwiva Forest. This species was long regarded as an Uluguru endemic, but is now known to exist also in the Ukagurus (Friedmann & Stager 1964, Evans & Andersen 1993) and in Mwanihana Forest in the Udzungwa Mountains (Jensen & Brøgger-Jensen 1992).

**Uluguru Violet-backed Sunbird** *Anthreptes neglectus* Several individuals were seen at the edge of the lowland forest and in thickets at the edge of the montane forest, at 1800 m.

**Moreau's Sunbird** *Nectarinia moreaui* Fairly common in the Ukwiva Forest. One male and one female were collected. The general colouration resembled specimens from the Nguru Mountains, the belly of the male being citrine with a yellow tinge as in typical *moreaui*, but exceptionally dark. However, its breast bar was scarlet (not orange) and very broad, completely separating the yellow lateral "tufts". This supports the observations made by A. Beakbane and E. Baker that an intergradation towards *N. mediocris fueilleborni* may exist (Jensen & Brøgger-Jensen 1992). Probably a DNA-based phylogeographic study will be needed to sort out the relationships of these taxa and of Loveridge's Sunbird *N. loveridgei*.

**Ploceus sp.** An unidentified male nuthatch-weaver was seen (and sketched in the field) in evergreen forest at 1900 to 2000 m (an unoccupied nest of the nuthatch-weaver type was also seen in this part of the forest). The observed bird was a typical nuthatch-weaver by jizz and behaviour, strikingly golden yellow with darker throat. The central throat was described as blackish, grading through golden brown to the yellow breast and through olive-brown on cheeks and forehead to the yellow on the back of the head. The tail was yellow laterally. No further details could be seen. The bird appeared to differ from the Olive-headed Golden Weaver *P. olivaceiceps* (distributed from Zambia to southwestern Tanzania) by its darker mid-throat, an extension of brown colour to the forehead and by more yellowish wings and tail. Furthermore, the habitat differs from that of *P. olivaceiceps*, which is a bird of *miombo* woodland.

The nuthatch-weavers fall into two morphological groups insofar as the species are either very yellow (*P. alenius*, *ocularis* and *olivaceiceps*) or extensively dark above (*P. bicolor*, *nigricollis*, *melanogaster* and *nicolli*). Although this difference is conspicuous, it could have a very simple genetic basis. Therefore, a possible interpretation

would be that the Ukwiva bird represents a small isolated yellow-morph population of the otherwise dark-backed Usambara Weaver *P. nicolli*, which has an apparently relict distribution with small populations in the East Usambara (*P. n. nicolli*) and Udzungwa and Uluguru mountains (*P. n. anderseni*) (Franzmann 1983).

**Streaky Seed-eater *Serinus striolatus*** One bird was seen by MA on 17 September at the edge of dense forest southwest of Madizini. Yellow head-stripes, characteristic of the Udzungwa form, *S. s. whytii*, were lacking.

## Discussion

The species abundance curves for rich tropical faunas are normally characterized by a few moderately common species and a long "tail" of low-density species. In Amazonian rainforest, where the number of low-density species is very high, considerable effort and several techniques are needed to find all species (see Terborgh *et al.* 1990). Considering the urgent need for ornithological data from dwindling tropical forests, rapid surveys of several localities must be prioritized over such complete inventories. For comparative purposes, it therefore becomes highly important to standardize the data-gathering and to always use the same method. Using rarefaction methods, corrections can then be made if sample sizes differ. However, such comparisons assume, *a priori*, a particular species abundance distribution, such as the log-normal (Kempton & Taylor 1974).

Standardized studies during the recent years in Tanzanian forest mosaics demonstrate an unusual species abundance curve, which is short-tailed and with a less concave shape (Fjeldså & Rabøl 1996; see also Stuart 1983, Moyer 1993, Moyer & Lovett *in press*). In communities of this type, accumulated curves for species observed or mist-netted level out fairly soon, indicating that the avifauna has been recorded fairly completely. Omitting the very rich Usambara and Udzungwa mountains, isolated forests of the Eastern Arc Mountains (whether large or small) have 45–50 bird species; 25-plot TSC samples typically giving 25–30 species, and mist-netting data indicating an asymptote level of *c.* 20 mist-net-prone species (Fjeldså & Rabøl 1996). The Madizini Forest agrees well with this norm (Fig. 2a, b), while the community of the Ukwiva Forest is enriched by a number of habitat generalists (Fig. 2c). As far as we could see from the hill-tops in the southern part of Ukwiva Forest, the habitat mosaic is such that Klaas' Cuckoo *Chrysococcus klaas*, Common Bulbuls *Pycnonotus barbatus*, Black-backed Puffbacks *Dryoscopus cubla*, Variable Sunbirds *Nectarinia venusta*, etc., may be expected to exist throughout this large forest tract. Thus, although the community of genuine forest birds is quite poor, the total species richness may be considerable, and a large effort will be needed to find all the species.

Dranzoa (1995) describes a similar situation for Kibale Forest (Uganda), of which large parts are selectively logged with patches of intact canopy. She considered that the logged parts of Kibale Forest are unlikely ever to recover (and support a typical forest bird community) without the exclusion of elephants.

Our survey data indicate some possible distribution gaps. The only *Apalis* warblers



found were Yellow-breasted *A. flavida* (lowlands) and Chestnut-throated *Apalis A. porphyrolaema* (montane forest); thus, Bar-throated *A. thoracica*, Brown-headed *A. alticola* and Black-headed *A. melanocephala* are missing. The Iringa Akalat *Sheppardia lowei* is recorded from the Udzungwa and Ukaguru Mountains (possibly different subspecies according to Stuart *et al.* 1993), but were neither heard nor mist-netted in what appeared to be suitable habitat in the Rubeho Mountains. It was also remarkable that we recorded no barbets at all in the lowlands and foothills, and only Moustached Green Tinkerbird *Pogoniulus leucomystax* in the high parts (where it was common). The Drongo *Dicrurus adsimilis* was common in the foothills but we did not find Square-tailed Drongo *D. ludwigii* (a common species in foothills and submontane forest on adjacent mountains). Similarly, Dark-backed Weaver *Ploceus bicolor* (which usually follows Square-tailed Drongo in mixed-species foraging flocks) was absent. In the lowland forest, the Little Greenbul *Andropadus virens* was common, and a few calls of Yellow-streaked Greenbul *Phyllastrephus flavostriatus* were heard, but we missed such common species as Fischer's Greenbul *P. fischeri* and Yellow-bellied Greenbul *Chlorocichla flaviventris*.

While the total species richness is fairly constant in Eastern Arc forests, the number of forest specialists, and restricted-range species in particular, varies much between mountains (Fjeldså & Rabøl 1996). Thus, only two Red Data Book-listed species were found in the Rubehos: Mrs Moreau's Warbler and Moreau's Sunbird (compared with ten in the adjacent eastern part of the Udzungwa Mountains). Mrs Moreau's Warbler is typical of disturbed areas within forest, such as dense herbaceous vegetation in landslide areas and other large light-gaps (Collar & Stuart 1985). This bird may probably be favoured by the habitat disturbance caused by elephants.

### Acknowledgements

The authors would like to thank E. Bering, L. Mbize, J.B. Rasmussen and T. Msangi for company during the fieldwork. For comments on a manuscript draft and on the full species list we thank D. C. Moyer and N. E. Baker. The fieldwork of the Danish Centre for Tropical Biodiversity is supported economically by the Natural Science Research Council (grant J.nr. 11-0390).

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*J. Fjeldså and M. Andersen, Zoologisk Museum, Københavns Universitet, Universitetsparken 15, DK 2100 København Ø, Denmark and K. Howell, Zoology Department, University of Dar es Salaam, Box 35064, Dar es Salaam, Tanzania*